

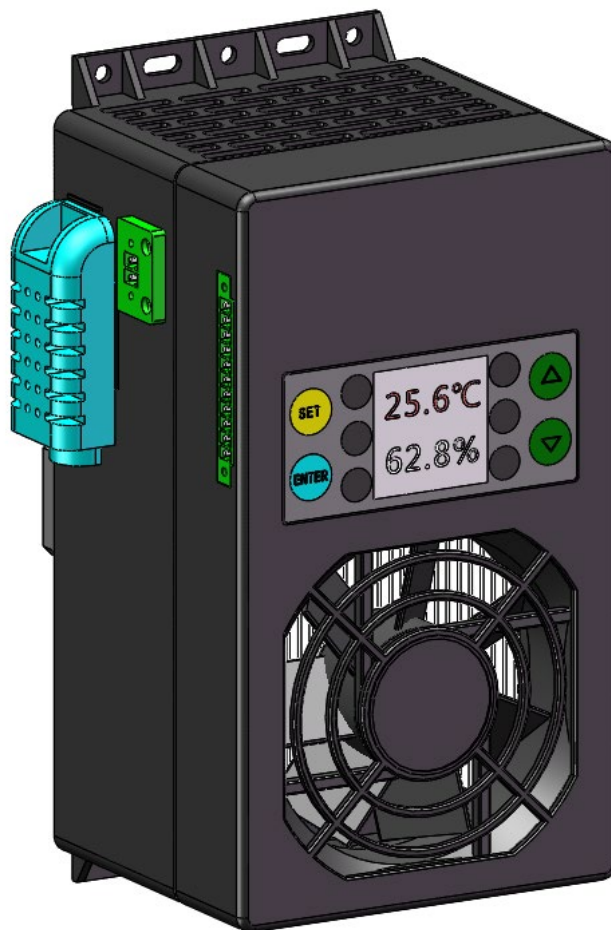


**P&N Technology**

Thermoelectric Assembly Manufacturer

# Dehumidifier Manual

Model: PN-D6012A / PN-D6424A / PN-D70ACA



REV 00

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Rev 01



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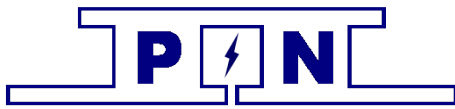
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## 1. Introduction

This series of dehumidifier use semiconductor thermoelectric technology. By making the surface temperature of the condenser in the dehumidifier lower than the dew point of the air, the vapor in the air condenses on the surface of the condenser, condensed water is removed out and realise the purpose of dehumidification and moisture-proof.

## 2. Features

- High dehumidifying capacity, excellent dehumidification and moisture-proof performance
- Users can set the humidity parameters according to their requirements, flexible and convenient for a wide range of applications
- Suitable for a variety of power supplies, including DC12V, DC24V, and AC110 to 230V
- Compact, light weight, suitable for small space
- Flexible installation, each model have DIN35 rail clasps and mounting hole
- External temperature and humidity sensor facilitates sensor location and maintenance
- Low power consumption, no refrigerant, environment friendly and high safety
- Equipped with relay connection port for control of external heater
- RS485 communication function
- With abnormal humidity alarm, abnormal temperature alarm, running duration monitor, regular maintenance reminder functions

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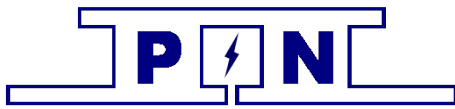
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## 3. Applications

This series of products can effectively reduce the air humidity in a relatively confined space, and can be widely used in areas with high requirements for air humidity, damp proof, anti-condensation, anti-mold and anti-corrosion, reference the following markets:

- Electrical and power
- Traffic
- Communication
- Industrial equipment
- Storage
- Exhibition

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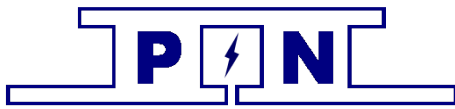
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## 4. Parameters

Items	Parameters		
Model	PN-D6012A	PN-D6424A	PN-D70ACA
Working power supply	DC 12V	DC 24V	AC 110~230V
Electric power	60W	64W	70W
Dehumidifying capacity	520ml/24h (35°C RH=85%)	520ml/24h (35°C RH=85%)	520ml/24h (35°C RH=85%)
Outline dimension	100mmX195mmX94mm	100mmX195mmX94mm	100mmX195mmX94mm
Humidity detection range	0%RH~100%RH	0%RH~100%RH	0%RH~100%RH
Humidity measurement accuracy	±2%RH	±2%RH	±2%RH
Temp measurement accuracy	0.3°C	0.3°C	0.3°C
Dehumidification start value	User setting(1%RH-99%RH)	User setting(1%RH-99%RH)	User setting(1%RH-99%RH)
Dehumidification stop value	User setting(1%RH-99%RH)	User setting(1%RH-99%RH)	User setting(1%RH-99%RH)
Storage temperature	-30°C~70°C	-30°C~70°C	-30°C~70°C
Operating temperature	-20°C~60°C	-20°C~60°C	-20°C~55°C
Relay control	DC 5V for external heater	DC 5V for external heater	DC 5V for external heater
Communication	RS485	RS485	RS485
Temp and humidity sensor	External	External	External
Installation	DIN35 and Screw	DIN35 and Screw	DIN35 and Screw
More function	<ul style="list-style-type: none"> <li>High humidity alarm</li> <li>Low humidity alarm</li> <li>High temperature alarm</li> <li>low temperature alarm</li> <li>Running duration monitor</li> <li>Maintenance period setting</li> </ul>	<ul style="list-style-type: none"> <li>High humidity alarm</li> <li>Low humidity alarm</li> <li>High temperature alarm</li> <li>low temperature alarm</li> <li>Running duration monitor</li> <li>Maintenance period setting</li> </ul>	<ul style="list-style-type: none"> <li>High humidity alarm</li> <li>Low humidity alarm</li> <li>High temperature alarm</li> <li>low temperature alarm</li> <li>Running duration monitor</li> <li>Maintenance period setting</li> </ul>
Weight	770g	770g	880g
Drainage	External aqueduct	External aqueduct	External aqueduct



## 5. Function description

### 5.1 Dehumidification

This series of products have a built-in semiconductor thermoelectric module (abbreviation TEM). The hot side of TEM is touched with a large aluminum heat sink to realize the heat dissipation. The cold side of the TEM is touched with the condenser. When the TEM is working, the surface temperature of condenser is reduced. When the surface temperature is lower than the dew point of air, vapor in the air condenses into water and accumulates on the surface of the condenser. The water drops into collecting tank under the action of gravity, and flow out through the external aqueduct.

A fan in the dehumidifier inhales external air into the heat dissipation duct and the condensing duct at the same time. When the air in the condensing duct scours the condenser, vapor condenses continuously, thus reducing the relative humidity of the air. When dehumidifier is installed in a confined space, dehumidifier can keep above process and reduce the humidity, problems such as condensation, mold, corrosion and deterioration caused by high humidity can be solved.

### Dehumidification mode

This series of products have two dehumidification mode

#### a. Automatic mode

In automatic mode, the controller read temperature and humidity values from the external T/H sensor. User sets the dehumidification start value and dehumidification stop value. If the humidity is higher than the start value, the dehumidification function is enabled. In automatic dehumidification mode, the relative humidity can be controlled within a certain range (between start value and stop value).

#### b. Normally on mode

In normally on mode, when the dehumidifier is powered on, the dehumidification function is always enabled. The dehumidification function is not controlled based on the humidity value.

*Reminder: For small and well-sealed space, normally on mode may reduce relative humidity to a very low level.*

### 5.2 Heating

No internal heater in the product. The heating function of this product is the function of controlling the

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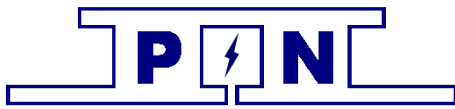
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external heater, which is only a control function.

User sets the heating start value and heating stop value. When the temperature of the external T/H sensor is lower than the heating start value, the heater connection port (port 3, port 4) maintains the DC 5V voltage. If a heater's relay connected with the heater connection port (port 3, port 4), the heater starts to work. When the temperature of the external T/H sensor is higher than the heating stop value, the voltage of the heater connection port (port 3, port 4) drops to 0V. then the heater stops working. With this function, temperature can be controlled within a certain range (between start value and stop value).

*Reminder: If no external heater connected, dehumidifier's heating indicator maybe still be on, but no any heating effect.*

## 5.3 Communication

This series of products have RS485 communication function. Users can connect this product to the host computer through connection ports (port 5, port 6, port 7) to realize data transmission and parameter setting.

The communication function facilitates the remote monitoring and batch control.

*Reminder: for more support about communication function please contact with manufacturer.*

## 5.4 Anti-frosting

The Anti-frosting function of this series of products refer to preventing the surface temperature of the condenser from being lower than 0°C, resulting in frost and icing on the surface of the condenser.

Icing on the surface of the condenser will reduce the dehumidification, block the condensing air duct, and generate condensate water outside the product.

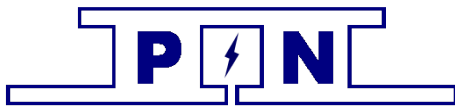
*Reminder: anti-frosting function is the built-in protection function of the product, and its operating parameters cannot be modified by users.*

## 5.5 Running duration monitor

This series of products have the function of monitoring the running duration. Users can analyze the duration of dehumidifier to provide reference for the maintenance of the dehumidifier.

### a. Current dehumidification duration

User can check the dehumidification duration when the dehumidification function is running. This



parameter specifies the duration from the dehumidification function start run to the checking moment. If the dehumidification function is not running, the data is 0.

## **b. Total dehumidification duration**

This duration refers to the total running time under dehumidification function from launch till checking moment.

## **c. Current heating duration**

User can check the heating duration when the heating function (heater control function) is running. This parameter specifies the duration from the heating function start run to the checking moment. If the heating function is not running, the data is 0.

## **d. Total heating duration**

This duration refers to the total running time under heating function (heater control function) from launch till checking moment.

## **e. Total working duration**

This duration refers to the total accumulated power-on time from launch to the checking moment.

## **5.6 Regular maintenance reminder**

This series of products have the function of regular maintenance reminder. User can set the duration of periodic maintenance reminder. When the cumulative power-on duration of the product reaches the reminding time set by the user, the product will send an alarm signal to remind.

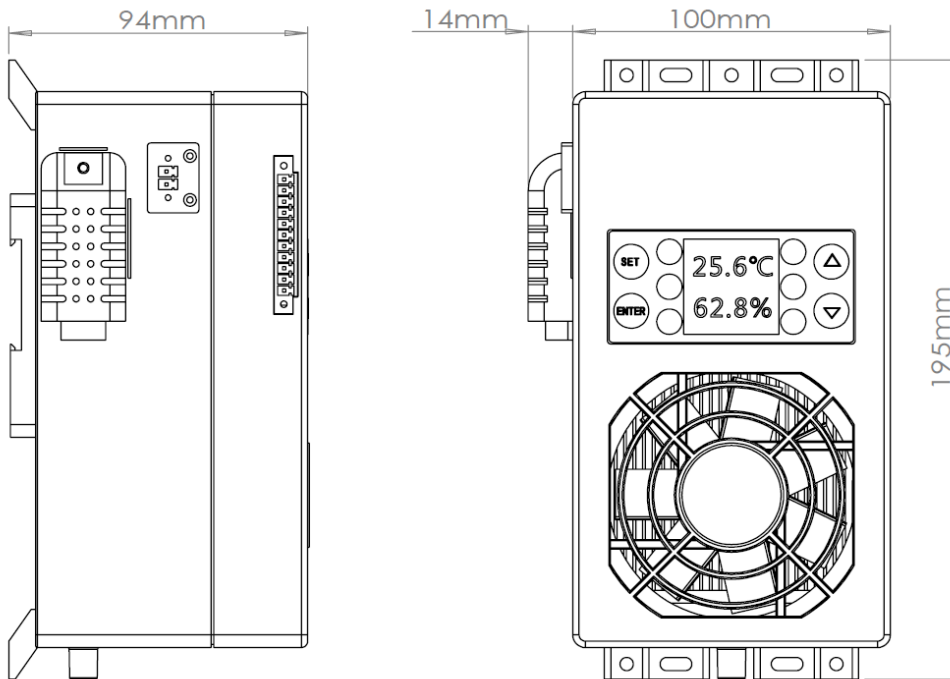
Users can choose to disable this function.



## 6. Dehumidifier outline



## 7. Outline dimensions



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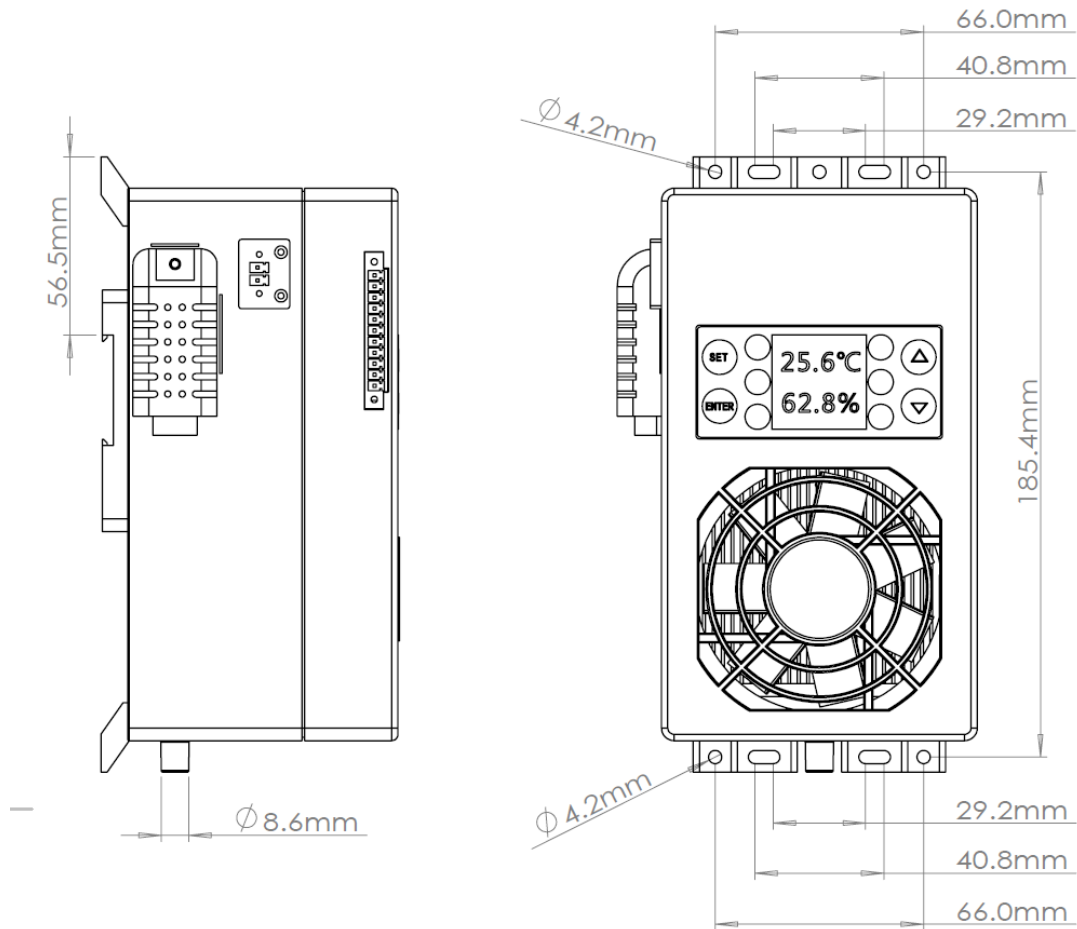
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## 8. Mounting dimensions



## Installation guides

1. Install this series of dehumidifier vertically
2. DIN35 rail or M4 screw to fix the dehumidifier
3. The top of the dehumidifier (air inlet) and the front (air outlet) suggest to keep more than 8cm from other devices, to ensure the air flowing freely
4. Insert the aqueduct into the joint at the bottom of the dehumidifier, and fix the other side of the aqueduct to the outside

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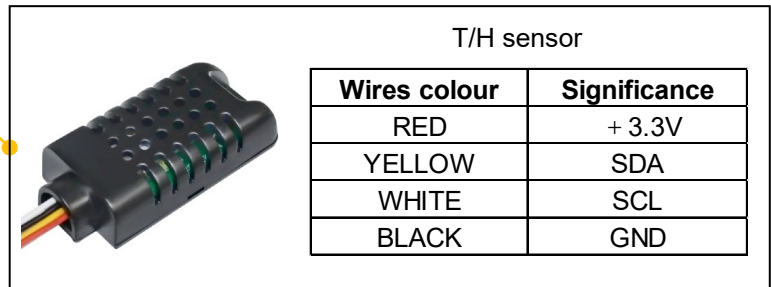
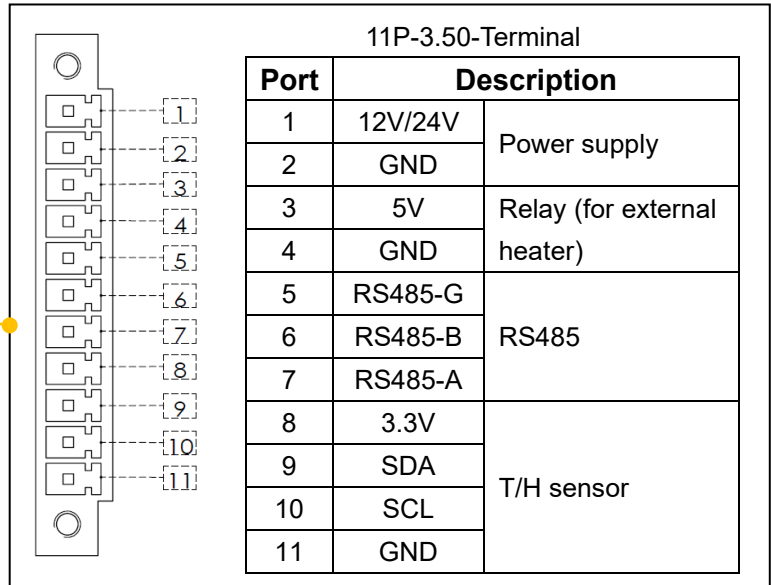
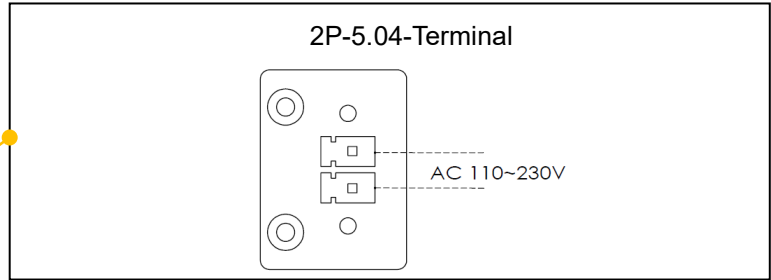
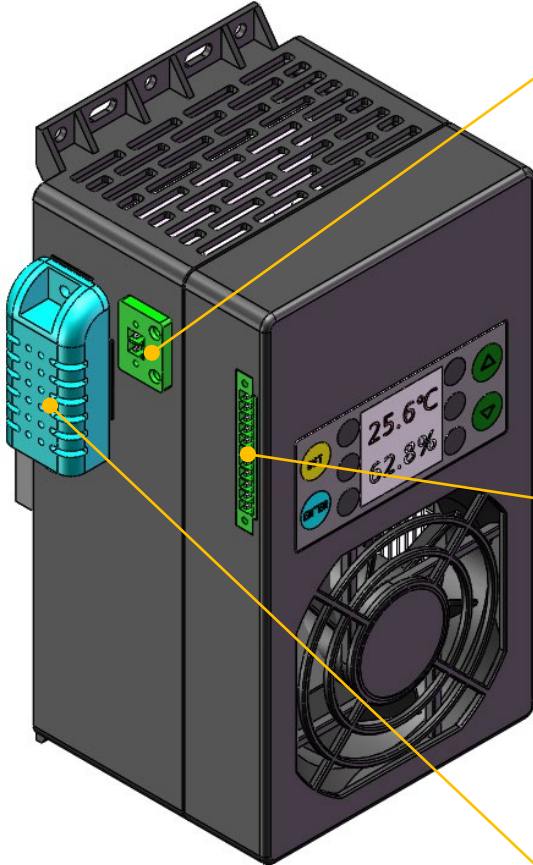
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## 9. Connections



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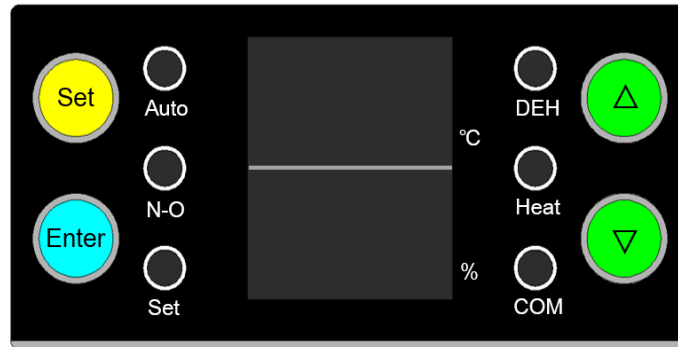
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## 10. Buttons and indicator lights



Indicator lights	Description	Running condition
Auto	Normally on	Dehumidifier running in automatic mode
N-O	Normally on	Dehumidifier running in normally on mode
Set	Normally on	Dehumidifier enters the setting mode
DEH	Normally on	Dehumidifier is dehumidifying
	Blink	Dehumidifier is anti-frosting
Heat	Normally on	Dehumidifier external heater connection keep DC 5V
COM	Blink	RS485 port is connected and data is being transmitted

*Note: When the dehumidifier is powered on, the dehumidifier will perform a startup self-test. During the self-test, all indicators of the dehumidifier remain normally on.*

Buttons	Description
Set	<ul style="list-style-type: none"> <li>Press once to enter setting mode</li> <li>Press once to exit setting mode</li> </ul>
Enter	<ul style="list-style-type: none"> <li>In setting mode, enter sub-function (P1~P17)</li> <li>In setting mode, save setting and exit sub-function (P1~P17)</li> </ul>
△	<ul style="list-style-type: none"> <li>In setting mode, page up sub-function (P1~P17)</li> <li>In sub-function, press once or long to increase the parameter value</li> <li>In sub-function, press once to turn on and turn off</li> </ul>
▽	<ul style="list-style-type: none"> <li>In setting mode, page down sub-function (P1~P17)</li> <li>In sub-function, press once or long to decrease the parameter value</li> <li>In sub-function, press once to turn on and turn off</li> </ul>

## 11. Startup self-test

### Symbol interpretation

H: Humidity measured by the external T/H sensor

T: Temperature measured by the external T/H sensor

Startup self-test		Screen 1	Screen 2	buzzer
Startup	Self-testing	000-999	000-999	
	Self-test finished	H	T	Last 2 seconds

*Note: The screen of the dehumidifier consists of two pieces 3-bit nixie tube, the top 3-bit nixie tube is Screen 1, the bottom 3-bit nixie tube is Screen 2.*

## 12. Running process

### Symbol interpretation

H: Humidity measured by the external T/H sensor

T: Temperature measured by the external T/H sensor

NTC-T: Temperature measured by the NTC sensor mounted on the condenser

Running process		Screen 1	Screen 2
Automatic mode	Dehumidification is not started	H	T
	Dehumidification is running	H	T
	Heating is not started	H	T
	Heating is running	H	T
	Anti-frosting	d	NTC-T
Normally on mode	Dehumidification is running	H	T

*Note: The screen of the dehumidifier consists of two pieces 3-bit nixie tube, the top 3-bit nixie tube is Screen 1, the bottom 3-bit nixie tube is Screen 2.*

## 13. Setting mode

### Symbol interpretation

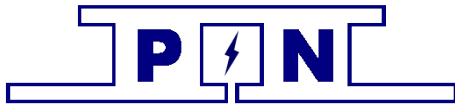
H: Humidity measured by the external T/H sensor

T: Temperature measured by the external T/H sensor

NTC-T: Temperature measured by the NTC sensor mounted on the condenser

XXX: Numbers

Process	Code	Sub-function	Screen 1	Screen2	Range and Unit
<ul style="list-style-type: none"> <li>• Click <b>SET</b> to enter setting mode</li> <li>• Click <b>▲</b> or <b>▼</b> to select sub-function</li> <li>• Click <b>ENTER</b> to enter sub-function</li> <li>• Click <b>ENTER</b> to save the current setting and exit</li> <li>• Click <b>SET</b> to exit setting mode</li> <li>• Note: If more than 30s no any operation, all current settings will not be saved and exit</li> </ul>	P1	Set humidity start value		H	1%~99% (start value - stop value ≥1)
	P2	Set humidity stop value		H	1%~99% (start value - stop value ≥1)
	P3	Set temperature start value		T	-30℃~40℃ (stop value - start value ≥1)
	P4	Set temperature stop value		T	-20℃~50℃ (stop value - start value ≥1)
	P5	Normally on mode switch		ON/OFF	Default OFF, if switch to ON, buzzer will play a low frequency beep for 5s
	P6	Communication address check and modify		XXX	Default 1, range 1~99
	P7	Check current dehumidification duration	XXX	XXX	0~999999, Unit: hour
	P8	Check total dehumidification duration	XXX	XXX	0~999999, Unit: hour
	P9	Check current heating duration	XXX	XXX	0~999999, Unit: hour
	P10	Check total heating duration	XXX	XXX	0~999999, Unit: hour



	P11	Check total working duration	XXX	XXX	0~999999, Unit: hour
	P12	Set low humidity alarm limit		H	Default 15%, range 1%~99% (high limit - low limit $\geq 1$ )
	P13	Set high humidity alarm limit		H	Default 98%, range 1%~99% (high limit - low limit $\geq 1$ )
	P14	Set low temperature alarm limit		T	Default -10°C, range -40°C~30°C (high limit - low limit $\geq 1$ )
	P15	Set high temperature alarm limit		T	Default 55°C, range -10°C~80°C (high limit - low limit $\geq 1$ )
	P16	Regular maintenance reminder switch		ON/OFF	Default OFF, start timing after setting to ON, if switch to ON, buzzer will play a low frequency beep for 5s
	P17	set duration of maintenance reminder	XX	XXX	Default 720, range 0~59999, Unit: hour

*Note: The screen of the dehumidifier consists of two pieces 3-bit nixie tube, the top 3-bit nixie tube is Screen 1, the bottom 3-bit nixie tube is Screen 2.*

## 14. Alarm function

### Symbol interpretation

H: Humidity measured by the external T/H sensor

T: Temperature measured by the external T/H sensor

Code	Description	Screen 1	Screen 2	Screen display	Buzzer
A1	Current humidity lower than low humidity alarm limit	A1/H	T	Screen alternately blinks A1 and current temp and humidity value	Low frequency beep
A2	Current humidity higher than high humidity alarm limit	A2/H	T	Screen alternately blinks A2 and current temp and humidity value	Low frequency beep
A3	Current temperature lower than low temperature alarm limit	A3/H	T	Screen alternately blinks A3 and current temp and humidity value	Low frequency beep
A4	Current temperature higher than high temperature alarm limit	A4/H	T	Screen alternately blinks A4 and current temp and humidity value	Low frequency beep
A5	The time for regular maintenance is up	A5/H	T	Screen alternately blinks A5 and current temp and humidity value	Low frequency beep
A6	Normally on mode is enabled	A6/H	T	Screen alternately blinks A6 and current temp and humidity value	Low frequency beep

*Note: The screen of the dehumidifier consists of two pieces 3-bit nixie tube, the top 3-bit nixie tube is Screen 1, the bottom 3-bit nixie tube is Screen 2.*



## 15. Error warning

Code	Description	Screen 1	Screen 2	Source and inspection frequency	Buzzer
E1	T/H sensor error	E1		<ul style="list-style-type: none"> <li>Open circuit of any wire</li> <li>Short circuit of any two wires</li> <li>Completely stoped and check every 3s</li> </ul>	Hith frequency beep
E2	NTC error	E2	S/O	<ul style="list-style-type: none"> <li>If open circuit, display O</li> <li>If short circuit, display S</li> <li>Completely stoped and check every 3s</li> </ul>	Hith frequency beep
E3	Fan error	E3		<ul style="list-style-type: none"> <li>Fan's rotate speed lower than 300rpm</li> <li>Completely stoped and check every 10s</li> </ul>	Hith frequency beep

*Note: The screen of the dehumidifier consists of two pieces 3-bit nixie tube, the top 3-bit nixie tube is Screen 1, the bottom 3-bit nixie tube is Screen 2.*

## 16. Packaging list

No.	Items	Qty	Remarks
1	Dehumidifier	1pcs	PN-D6012A or PN-D6424A or PN-D70ACA
2	T/H sensor	1pcs	
3	11P wire terminal	1pcs	
4	2P wire terminal	1pcs	Only for PN-D70ACA model
5	Silicone rubber aqueduct	1pcs	Length 1.2m
6	Nylon harness	1pcs	To fix aqueduct
7	Product manual	1pcs	Or electronic version

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